

U.S.S.N. 10/040,104

**REMARKS**

Thorough examination and careful review of the application by the Examiner is noted and appreciated.

Claims 1-2 and 4-20 are pending in the application.  
Claims 1-2 and 4-20 stand rejected.

**Claim Rejections Under 35 USC §103**

Claims 1, 4-7 and 14-19 are rejected under 35 USC §103(a) as being unpatentable over Park et al (Pat. Publ. '088) in view of Hajdukiewicz et al '151. It is contended that Park et al discloses substantially the present invention except that Park et al's wafer pick up system does not show the strain sensor is sensitive to at least 1 micrometer displacement, and such is disclosed by Hajdukiewicz et al. The Examiner contended that Hajdukiewicz et al shows a strain gauge or sensor having a high sensitivity for measuring the movement of from -0.5 microns to 2 microns.

The rejections of claims 1, 4-7 and 14-19 under 35 USC §103(a) based on Park et al and Hajdukiewicz et al is respectfully traversed.

U.S.S.N. 10/040,104

While the Applicants agree with the Examiner that Park et al does not show the strain sensor is sensitive to at least 1 micrometer displacement, the Applicants respectfully submit that such is neither shown by Hajdukiewicz et al.

Contrary to the Examiner's contention that Hajdukiewicz et al "shows a strain gauge or sensor having a high sensitivity for measuring the movement of from -0.5 microns to 2 microns" (col. 4, lines 10-24), Hajdukiewicz et al discloses at col. 4, lines 15-17 the following:

"... it was possible to achieve a trigger signal from the stylus after **a movement of 2 microns, plus or minus 0.5 microns**, in any direction of application of force ..."

Hajdukiewicz et al therefore teaches a sensor that is **capable of detecting** a movement between 1.5 microns and 2.5 microns. Hajdukiewicz et al does not teach a sensor that is capable of detecting to a sensitivity of at least 1 micron displacement, as presently claimed in independent claims 1 and 14.

U.S.S.N. 10/040,104

Moreover, Hajdukiewicz et al discloses a probe for measuring work pieces that has a body for attachment to a machine and a work piece contacting stylus carried by a stylus holder mounted within the body. Hajdukiewicz et al does not teach a semiconductor fabrication equipment and therefore, is in a completely different art then that of Park et al. As such, there cannot be any motivation to combine the two references in arriving at the present invention wafer blade equipped with strain sensors capable of measuring to a sensitivity of at least 1 micron displacement.

The rejection of claims 1, 4-7 and 14-19 under 35 USC §103(a) based on Park et al and Hajdukiewicz et al is respectfully traversed. A reconsideration for allowance of these claims is respectfully requested of the Examiner.

Claims 1-2 and 4-20 are rejected under 35 USC §103(a) as being unpatentable over Park et al in view of Westervelt et al '507. It is contended that while Park et al's wafer pick-up system does not show the thickness of the strain sensor is 1 micrometer, such is shown by Westervelt et al in a semiconductor piezoelectric strain device to achieve the levels of sensitivity beyond the prior art and to provide a stain sensitivity of  $2 \times 10^{-9}$ .

U.S.S.N. 10/040,104

The rejections of claims 1-2 and 4-20 under 35 USC §103(a) based on Park et al and Westervelt et al is respectfully traversed.

While the Applicants respectfully agree with the Examiner that Park et al does not teach a strain sensor that has a sensitivity to at least 1 micron displacement, such is neither taught by Westervelt et al.

Westervelt et al discloses strain gauges that are capable of measuring strain and express in strain units, such as  $2 \times 10^{-9}$ . However, Westervelt et al does not teach a sensor that is capable of a sensitivity in measurement of a displacement of at least 1 micron. The stain gauges disclosed by Westervelt et al are only capable of measuring a unit-less quantity of strain, but not in units of microns (i.e. at least 1 micron) displacement. The Applicants respectfully submit that neither Park et al nor Westervelt et al, either singularly or in combination thereof, discloses the present invention wafer blade that is equipped with a strain sensor capable of a sensitivity to at least 1 micron displacement.

U.S.S.N. 10/040,104

The Applicants further submit that independent claim 8 recites a piezoelectric sensor mounted on the bottom surface of a wafer blade, which is not taught or disclosed by Park et al nor Westervelt et al, either singularly or in combination thereof.

A reconsideration for a separate allowance of claims 8-13 is respectfully requested of the Examiner.

Claims 1-2 and 4-20 are rejected under 35 USC §103(a) as being unpatentable over Park et al in view of Chen et al (Pat. Pub.'960). It is contended that while Park et al does not show the strain sensor is sensitive to at least 1 micron displacement, such is disclosed by Chen et al in a thin film, piezoelectric layer.

The rejections of claims 1-2 and 4-20 under 35 USC §103(a) based on Park et al and Chen et al is respectfully traversed.

In the 04/22/2004 Office Action, page 6, middle of page, the Examiner contended that "it is pointed out that the Park et al wafer pick-up system in view of Chen et al does not clearly show the displacement of the sensor is at least 1 micrometer. However, it would have been an obvious design choice to provide a high

U.S.S.N. 10/040,104

sensitivity sensor or a piezoelectric sensing device on the modified Park et al's wafer pick-up system to accurately provide high sensitivity to the device". The Applicants respectfully traverse such arguments as improper ground for an obviousness rejection since the Applicants have clearly shown the criticality of such sensitivity in the application.

The criticality of using a strain sensor that has sensitivity to at least  $1\mu\text{m}$  strain is presented in the specification at Page 13, Paragraph 0036:

"The strain sensor should be sensitive to very small displacement, such as displacement as small as  $1\mu\text{m}$ . One of such suitable strain sensors to be utilized by the present invention wafer blade may be a piezoelectric thin film sensor."

Furthermore, at Page 14, Paragraph 0037:

"For instance, in the present invention application of a piezoelectric element or a piezoelectric thin film sensor on a bottom surface of a wafer blade **any minute contact with a wafer can be detected** and an alarm can be sent to an alarm panel located in a central process controller."

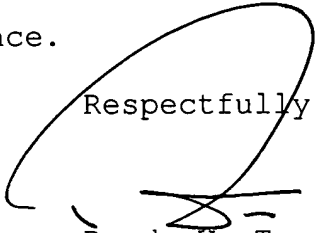
U.S.S.N. 10/040,104

The rejection of claims 1-2 and 4-20 under 35 USC §103(a) based on Park et al and Chen et al is respectfully traversed. A reconsideration for allowance of these claims is respectfully requested of the Examiner.

Based on the foregoing, the Applicants respectfully submit that all pending claims, i.e., claims 1-2 and 4-20, are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,



Randy W. Tung (31,311)